Attachment A. Scope of Work, Spokane R. Water Quality Modeling

Tasks:

Provide additional CE-QUAL-W2 model support for the Spokane River TMDL as described below.

1. Change the CE-QUAL-W2 model for the Spokane River so that a new water balance would not be necessary at the dams along the Spokane River if the model user adjusted flow rates from the lake or point sources or groundwater discharge. This would allow the much more efficient use of the model to explore difference flow rate regimes.

2. Revise model bathymetry so that low-flows from Idaho do not result in stability problems for the model. This involves bathymetry smoothing for segments close to the WA-ID state line. This would allow the model to run with flows lower than the 2001 low summer flows.

3. Change the CE-QUAL-W2 model so that the Washington and Idaho portions of the Spokane River model have comparable CBOD groups. The reason for this is the additional point sources in Idaho have added additional CBOD groups to the overall model. The purpose for having separate CBOD groups is that each material will decay according to its own (laboratory determined in most cases) decay rate and the impacts of each discharge can then be tracked individually in the Spokane River.

4. Run up to 5 model scenarios for the Spokane River Technical Modeling group. This task would include meetings to determine details about each scenario, setting up and running the CE-QUAL-W2 model for each scenario, evaluating and presenting the model results. Model results will be presented graphically and statistically based on input from Ecology on how to post-process the results.

5. Project Management:

    - Technical memos will be developed for each of the above tasks demonstrating the work accomplished.
    - Email, conference calls, presentations, 1 on-site meeting in Olympia

Deliverables:

- Technical memoranda
- Web posting and FTP access for all data and model files developed in this scope of work.

Budget:

- Not to exceed $15,922 (direct costs: $12,637, indirect costs: $3286)

A budget estimate is shown below:

		Hourly rate*								
		$93.71	$45.63	$47.01	$15.00					
		Hours for each task								
Task	Description	S. Wells	R. Annear	C. Berger	Student Hourly	Miscellaneous costs*	Total cost	Total Task cost	Direct	Indirect
	Task 1							$2,349	$1,865	$485
1.1	Change balance at each dam along Spokane River	2	0	30			$1,598			
1.2	Model testing	2	0	12			$752			
	Task 2							$2,349	$1,865	$485
2.1	Revise model bathymetry	2	0	30			$1,598			
2.2	Model testing	2	0	12			$752			
	Task 3							$376	$299	$78
3.1	Align CBOD groups/testing	0	0	8			$376			
	Task 4							$5,753	$4,566	$1,187
4.1	Determine scenario details	4	0	4			$563			
4.2	Set-up models for 5 scenarios	2	8	16			$1,305			
4.3	Make simulations	0	0	5			$235			
4.4	Model post-processing	6	24	36	20		$3,650			
	Task 5							$5,094	$4,043	$1,051
5.1	Technical memos	12	12	24	8	$150	$3,070			
5.2	Meetings, 1 trip to Olympia, email, presentations, conference calls	12	2	14		$150	$2,024			
	Totals	44	46	191	28	$300	$15,922	$15,922	$12,637	$3,286

* hourly rate includes benefits (SW:38%, RA:49%, CB: 49%) and overhead rate of 26%

* report xeroxing, binding, mailing costs, office/computer supplies, travel costs including overhead rate of 26%

Schedule:

- Complete Tasks and provide Deliverables no later than June 30, 2006.